



DRAWING SET

including ...

- block diagrams
- schematics
- assembly diagrams
- parts information

FOR SERVICE...

TOLL-FREE NUMBERS:

800-621-1253

IN ILLINOIS CALL:

800-572-1324

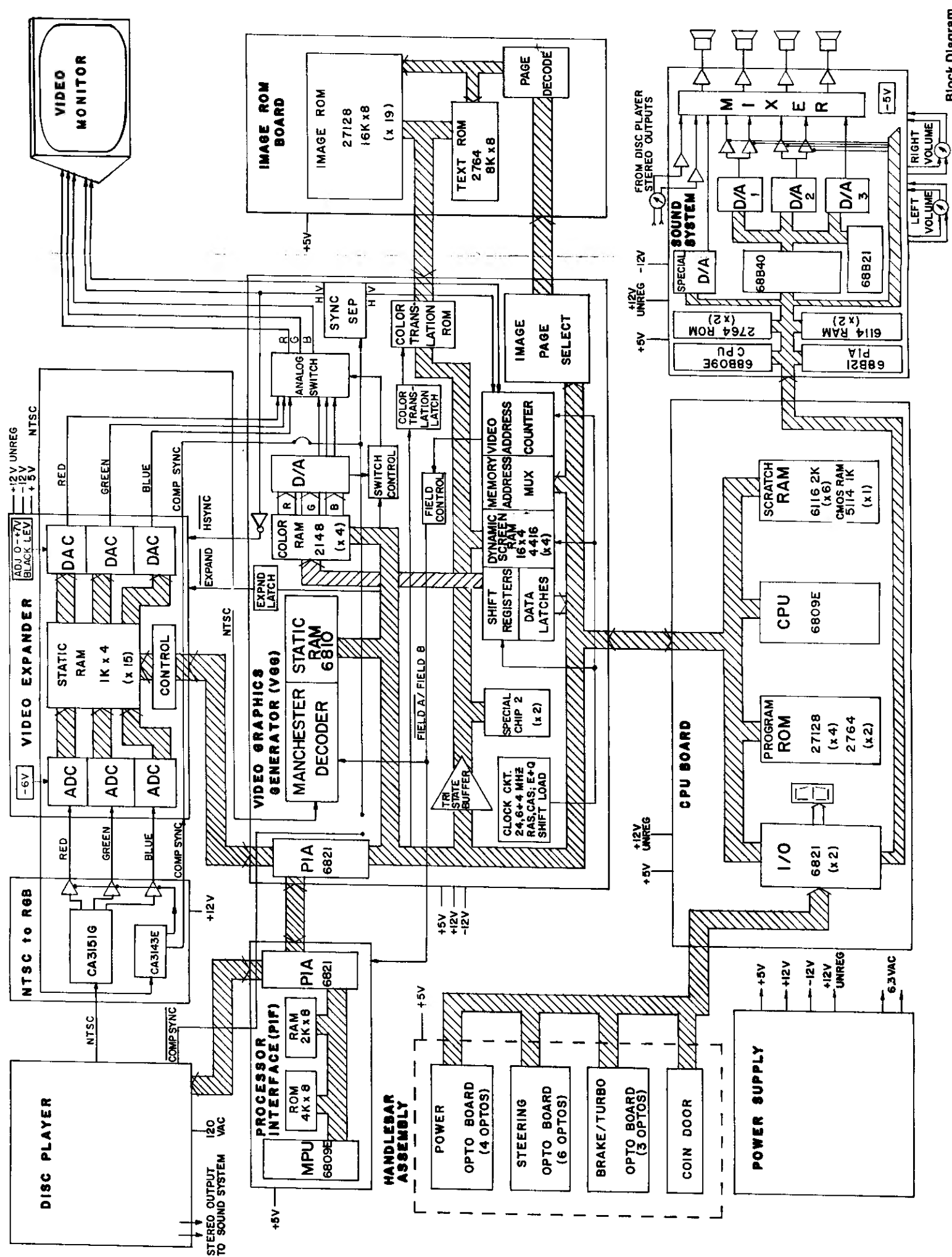
Williams 
ELECTRONICS, INC.

3401 N. California Av.

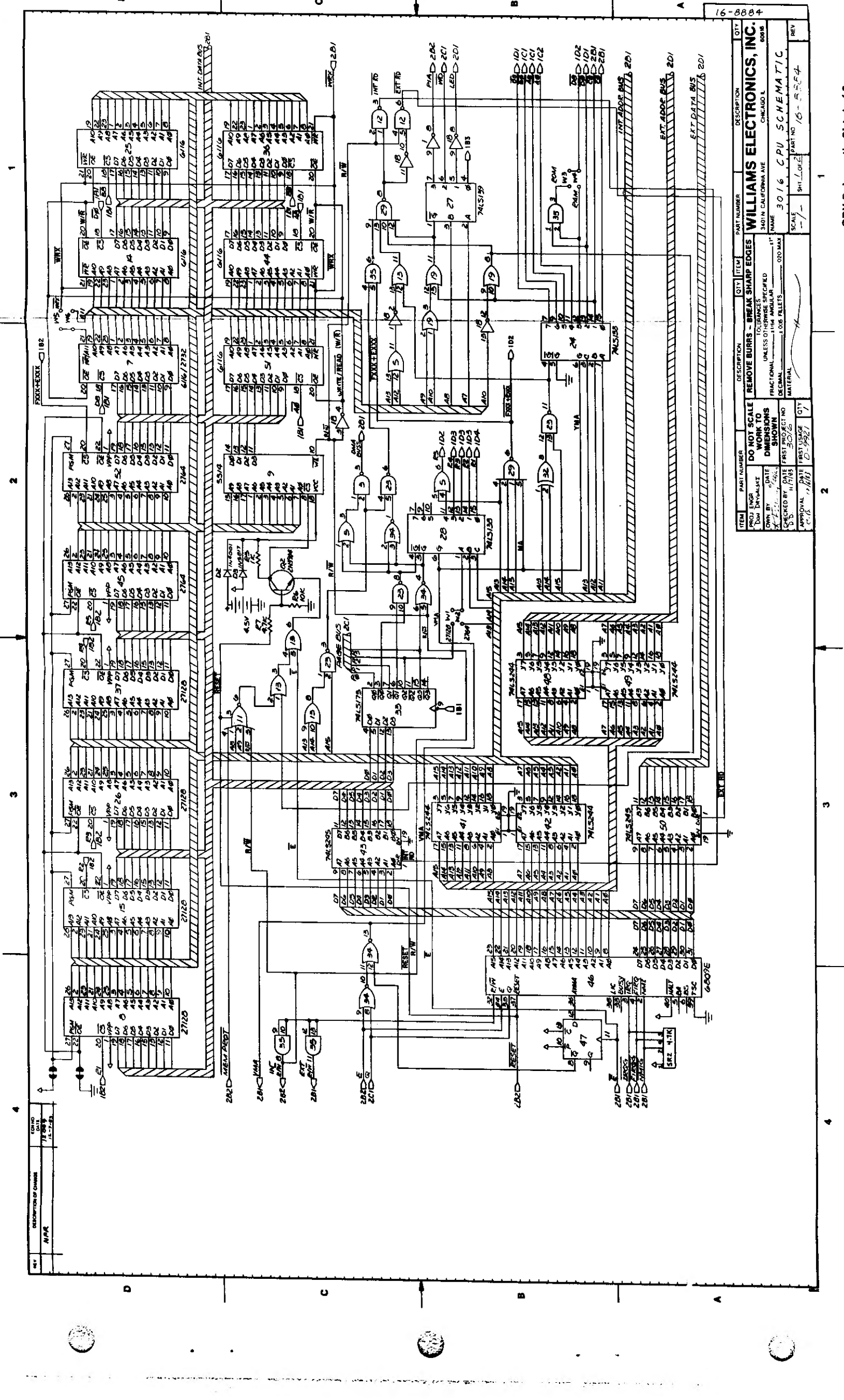
Chicago, IL 60618

(312) 267-2240

DISCAN SYSTEM BLOCK DIAGRAM



Block Diagram

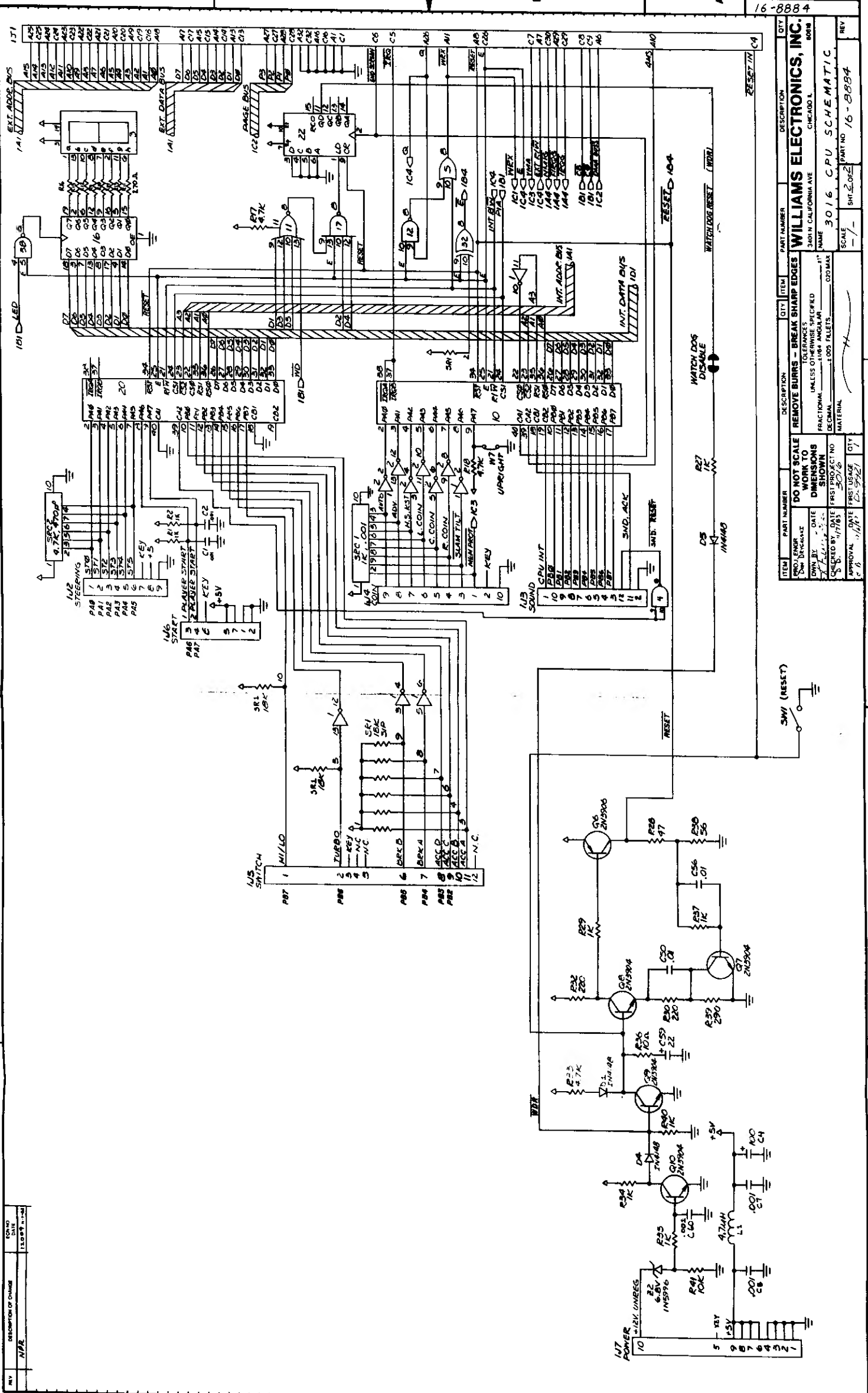


16-8884

ITEM	PART NUMBER	DESCRIPTION	QTY	TEST	PART NUMBER	DESCRIPTION	QTY
1	74LS100	REMOVE BURRS - BREAK SHARP EDGES	1		74LS100	REMOVE BURRS - BREAK SHARP EDGES	1
2	74LS130	DO NOT SCALE WORK TO DIMENSIONS SHOWN	1		74LS130	DO NOT SCALE WORK TO DIMENSIONS SHOWN	1
3	74LS138	UNLESS OTHERWISE SPECIFIED	1		74LS138	UNLESS OTHERWISE SPECIFIED	1
4	74LS153	FRACTIONAL INCH ANGLES	1		74LS153	FRACTIONAL INCH ANGLES	1
5	74LS153	DECIMAL	1		74LS153	DECIMAL	1
6	74LS153	FIRST PROJECT NO	1		74LS153	FIRST PROJECT NO	1
7	74LS153	MATERIAL	1		74LS153	MATERIAL	1
8	74LS153	DATE	1		74LS153	DATE	1
9	74LS153	APPROVAL	1		74LS153	APPROVAL	1

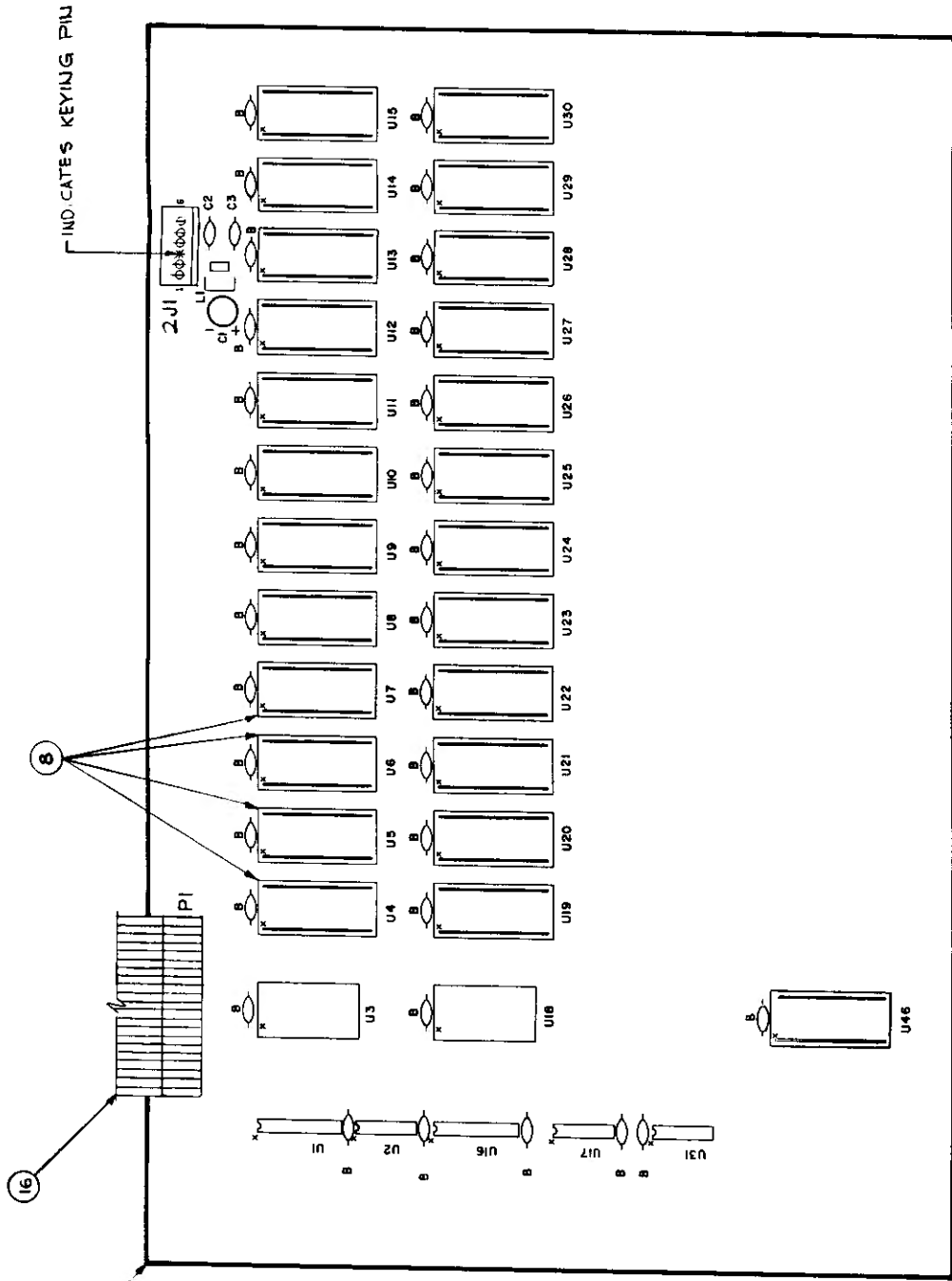
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1	74LS100	REMOVE BURRS - BREAK SHARP EDGES	1		74LS100	REMOVE BURRS - BREAK SHARP EDGES	1
2	74LS130	DO NOT SCALE WORK TO DIMENSIONS SHOWN	1		74LS130	DO NOT SCALE WORK TO DIMENSIONS SHOWN	1
3	74LS138	UNLESS OTHERWISE SPECIFIED	1		74LS138	UNLESS OTHERWISE SPECIFIED	1
4	74LS153	FRACTIONAL INCH ANGLES	1		74LS153	FRACTIONAL INCH ANGLES	1
5	74LS153	DECIMAL	1		74LS153	DECIMAL	1
6	74LS153	FIRST PROJECT NO	1		74LS153	FIRST PROJECT NO	1
7	74LS153	MATERIAL	1		74LS153	MATERIAL	1
8	74LS153	DATE	1		74LS153	DATE	1
9	74LS153	APPROVAL	1		74LS153	APPROVAL	1

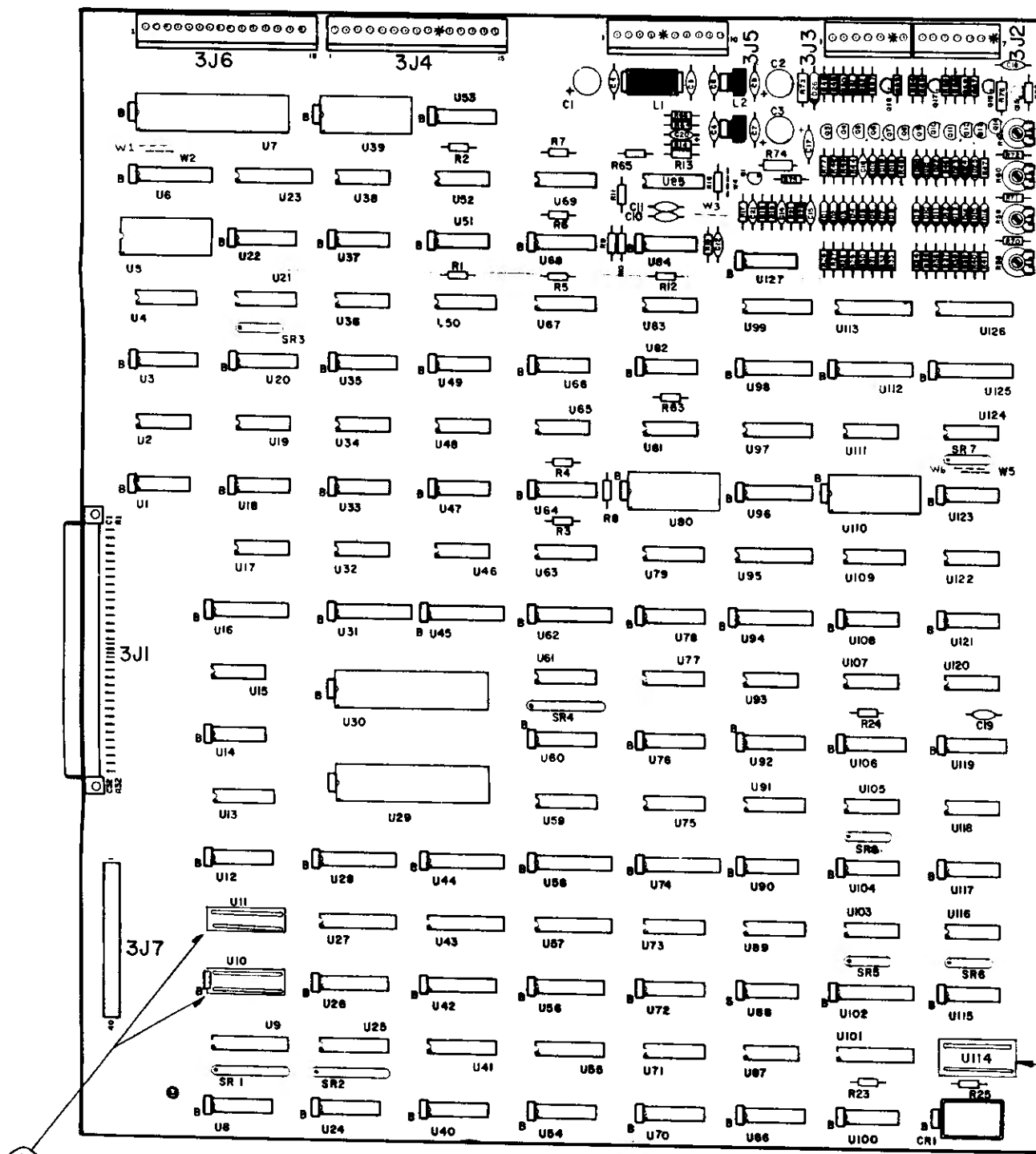
REV	DESCRIPTION OF CHANGE	DATE
1	N/A	12-09-77



ITEM	PART NUMBER	DESCRIPTION	QTY
1	U17	POWER SUPPLY	1
2	U13	CPU UNIT	1
3	U1	RAM 1K	1
4	U2	RAM 1K	1
5	U3	RAM 1K	1
6	U4	RAM 1K	1
7	U5	RAM 1K	1
8	U6	RAM 1K	1
9	U7	RAM 1K	1
10	U8	RAM 1K	1
11	U9	RAM 1K	1
12	U10	RAM 1K	1
13	U11	RAM 1K	1
14	U12	RAM 1K	1
15	U13	RAM 1K	1
16	U14	RAM 1K	1
17	U15	RAM 1K	1
18	U16	RAM 1K	1
19	U17	RAM 1K	1
20	U18	RAM 1K	1
21	U19	RAM 1K	1
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23	U21	RAM 1K	1
24	U22	RAM 1K	1
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26	U24	RAM 1K	1
27	U25	RAM 1K	1
28	U26	RAM 1K	1
29	U27	RAM 1K	1
30	U28	RAM 1K	1
31	U29	RAM 1K	1
32	U30	RAM 1K	1
33	U31	RAM 1K	1
34	U32	RAM 1K	1
35	U33	RAM 1K	1
36	U34	RAM 1K	1
37	U35	RAM 1K	1
38	U36	RAM 1K	1
39	U37	RAM 1K	1
40	U38	RAM 1K	1
41	U39	RAM 1K	1
42	U40	RAM 1K	1
43	U41	RAM 1K	1
44	U42	RAM 1K	1
45	U43	RAM 1K	1
46	U44	RAM 1K	1
47	U45	RAM 1K	1
48	U46	RAM 1K	1
49	U47	RAM 1K	1
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83	U81	RAM 1K	1
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86	U84	RAM 1K	1
87	U85	RAM 1K	1
88	U86	RAM 1K	1
89	U87	RAM 1K	1
90	U88	RAM 1K	1
91	U89	RAM 1K	1
92	U90	RAM 1K	1
93	U91	RAM 1K	1
94	U92	RAM 1K	1
95	U93	RAM 1K	1
96	U94	RAM 1K	1
97	U95	RAM 1K	1
98	U96	RAM 1K	1
99	U97	RAM 1K	1
100	U98	RAM 1K	1

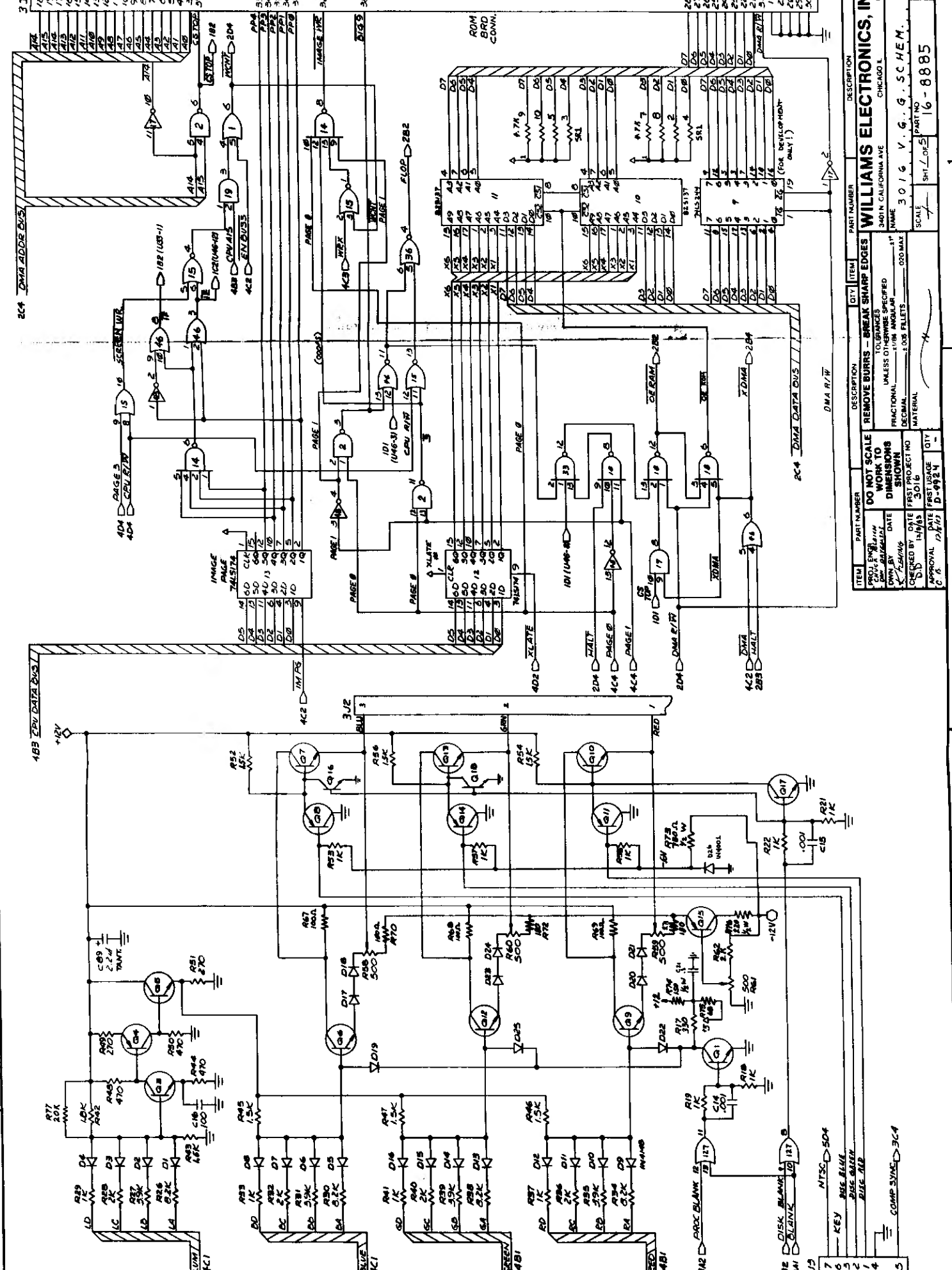
ITEM	PART NUMBER	DESCRIPTION	QTY
1	U17	POWER SUPPLY	1
2	U13	CPU UNIT	1
3	U1	RAM 1K	1
4	U2	RAM 1K	1
5	U3	RAM 1K	1
6	U4	RAM 1K	1
7	U5	RAM 1K	1
8	U6	RAM 1K	1
9	U7	RAM 1K	1
10	U8	RAM 1K	1
11	U9	RAM 1K	1
12	U10	RAM 1K	1
13	U11	RAM 1K	1
14	U12	RAM 1K	1
15	U13	RAM 1K	1
16	U14	RAM 1K	1
17	U15	RAM 1K	1
18	U16	RAM 1K	1
19	U17	RAM 1K	1
20	U18	RAM 1K	1
21	U19	RAM 1K	1
22	U20	RAM 1K	1
23	U21	RAM 1K	1
24	U22	RAM 1K	1
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26	U24	RAM 1K	1
27	U25	RAM 1K	1
28	U26	RAM 1K	1
29	U27	RAM 1K	1
30	U28	RAM 1K	1
31	U29	RAM 1K	1
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38	U36	RAM 1K	1
39	U37	RAM 1K	1
40	U38	RAM 1K	1
41	U39	RAM 1K	1
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73	U71	RAM 1K	1
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93	U91	RAM 1K	1
94	U92	RAM 1K	1
95	U93	RAM 1K	1
96	U94	RAM 1K	1
97	U95	RAM 1K	1
98	U96	RAM 1K	1
99	U97	RAM 1K	1
100	U98	RAM 1K	1





NOTES: 1. 'B' INDICATES BYPASS CAPACITOR.
 2. '*' INDICATES PIN CUT FOR KEYING.
 3. '.' INDICATES PIN 1 OR EMITTER 'E'.

REV	DESCRIPTION OF CHANGE	DATE
1	N/A	1/20/73



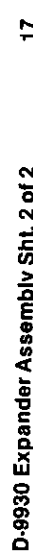
ITEM	PART NUMBER	DESCRIPTION	QTY
1	16-8885	WILLIAMS ELECTRONICS, INC.	1
2	16-8885	CHICAGO, ILL.	1
3	16-8885	NAME 3016 V.G.G. S.CHEM.	1
4	16-8885	SCALE 1/16" = 1"	1
5	16-8885	REV -	1

NOTES:

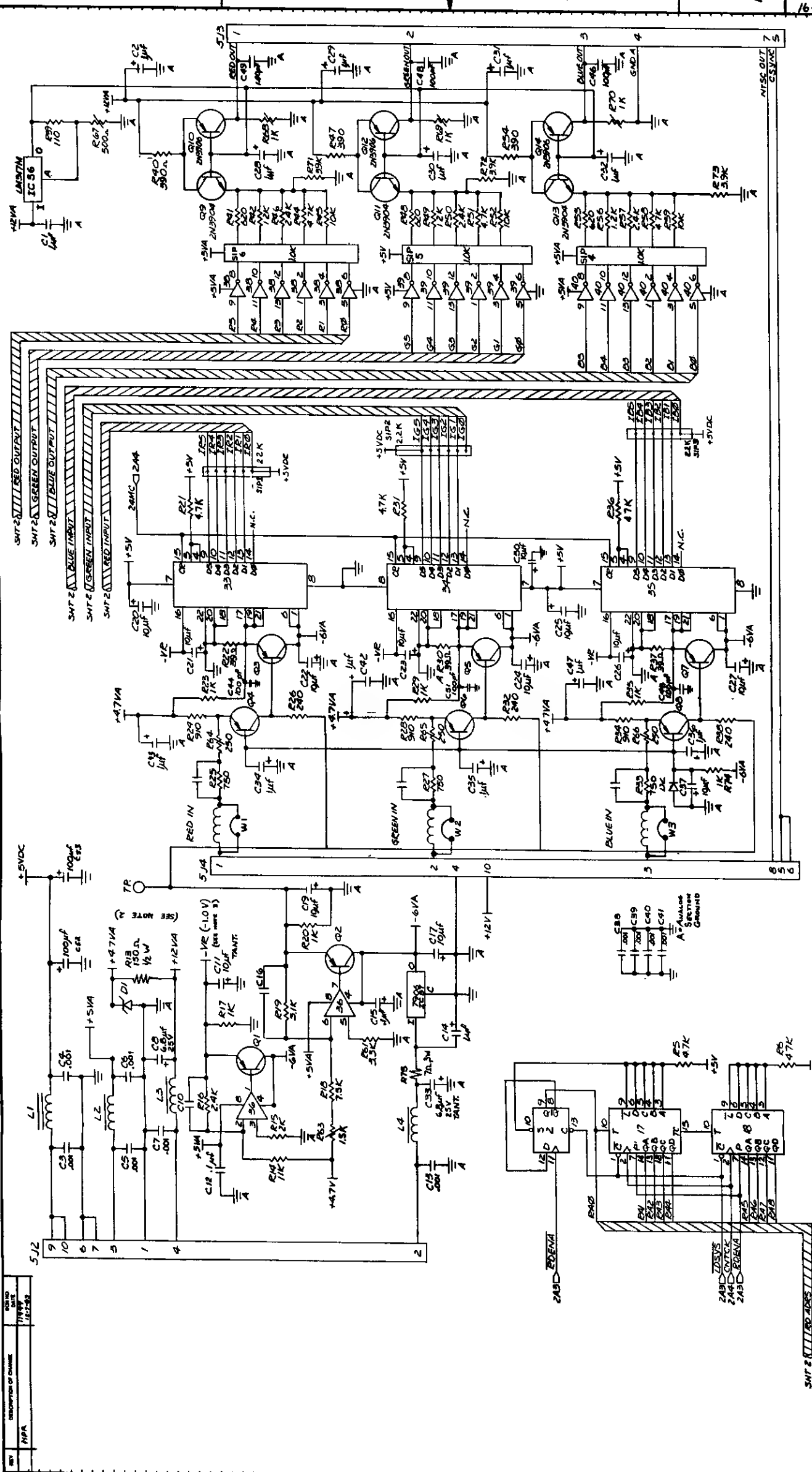
1. 1KPF CAPS.
C3, C4, C5, C6, C7, C13, C38,
C39, C40, C41.
2. "B" BYPASS CAPS. .01MF ON IC'S
NUMBER 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13,
14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26,
27, 28, 29, 37, 42, 43, 44, 45, 46, 47, 48, 50,
51, 52, 53
10MF CAPS.
C11, C17, C19, C20, C21, C22, C23, C24, C25,
C26, C27, C37, C40.
3. 1MF CAPS.
C2, C12, C14, C15, C23, C30, C31, C32, C34,
C38, C42, C43, C47, C49, C50, C56, C97, C98,
C99, C100, C101, C102, C103, C1, C28, C35
TRANSISTORS 2N126.
Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q12, Q14, Q10
RESISTORS 10K 1/4W 5%
R17, R20, R23, R25, R35, R37, R38, R39, R40, R41,
R12, R21, R31, R36, R44, R51, R58, R60, R61
IC 2148 S.RAMS
U7, U9, U9, U10, U28, U29, U24, U25,
U26.
4. IC 74F374
U11, U18, U19, U14, U15, U16, U27,
U28, U29, U30, U31, U32.
5. IC 74F74
U2, U37, U45, U46, U47, U50,
U51, U53, U54, U55

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
55	5041-	10588-00	CB, C33	25	5012-	10586-00	R75	RESISTOR, 7 OHMS	3W	1				
54	5041-	09243-00	SEE NOTE 3	13	5010-	10510-00	R40, R41, R54	RESISTOR, 390 OHMS	1/4W 2%	3				
53	5041-	09031-00	SEE NOTE 4	25	5010-	10204-00	SEE NOTE 6	RESISTOR, 1.0K OHMS	1/4W 2%	8				
52	5040-	09421-00	C52, C53	2	5010-	09634-00	W1, W2, W3	RESISTOR, 0 OHMS		3				
51	5075-	10476-00	D1	1	5010-	10510-00		RESISTOR, 59 OHMS	1/4W 5%	3				
50	5070-	08919-00	D2	1	5010-	09212-00	R22, R30, R37	RESISTOR, 150 OHMS	1/4W 5%	3				
49	5190-	10590-00	SEE NOTE 5	11	5010-	09187-00	R13	RESISTOR, 4.7K OHMS	1/4W 5%	1				
48	5160-	10569-00	Q9, Q11, Q13	3	5010-	10497-00	SEE NOTE 7	RESISTOR, 4.7K OHMS	1/4W 5%	20				
47	5551-	10161-00	L3, L4	2	5010-	08983-00	R61	RESISTOR, 5.3K OHM	1/4W 5%	1				
46	5551-	10552-00	L1, L2	2	5280-	09489-00	U17, U18	IC, 9316 CNTR		2				
45	5019-	10601-00	SIP1, SIP2, SIP3	3	5521-	10421-00	U53	IC, 08C 48MHz 1%		1				
44	5019-	10600-00	SIP4, SIP5, SIP6	3	5250-	10478-00	U56	REGULATOR, LM317K ADJ POS		1				
43	5015-	10587-00	R63	1	5250-	10477-00	U57	REGULATOR, 7906 1.0A 6V		1				
42	5015-	10420-00	R68, R69, R70	3	5372-	10467-00	U33, U34, U39	IC, 70C1014J ADC		3				
41	5015-	10419-00	R67	1	5370-	10531-00	U36	IC, 1458 OP-AMP		1				
40	5015-	10418-00	R64, R65, R66	3	5340-	10483-00	SEE NOTE 8	S/RAM, 1Kx4 3SN3		8				
39	5010-	08998-00	R15	1	5283-	10551-00	U48, U52	IC, 74F00 NAND GATE		2				
38	5013-	10543-00	R14	1	5282-	10189-00	U49	IC, 74S37 2/P		1				
37	5013-	10543-00	R14	1	5283-	10470-00	SEE NOTE 9	IC, 74F374 OCT LCH		12				
36	5013-	10546-00	R45, R52, R59	3	5282-	10432-00		IC, 74S374 OCT F/F		3				
35	5010-	10022-00	R18	1	5282-	10430-00	U41, U42	IC, 74S161 CNTR		3				
34	5013-	10544-00	R19	1	5283-	10554-00	U44	IC, 74F161 SYNC CTR		3				
33	5013-	10543-00	R71, R72, R73	3	5283-	10469-00	U3, U4, U5	IC, 74F257 2TO1 MUX		6				
32	5013-	10543-00	R16, R46, R50, R57	4	5282-	10431-00	U19, U20, U21	IC, 74S257A MLTPX		9				
31	5013-	10541-00	R42, R49, R56	3	5283-	10468-00	SEE NOTE 10	IC, 74F74 DUAL F/F		3				
30	5013-	10540-00	R24, R28, R34	3	5282-	10190-00		IC, 74S74 DUAL F/F		3				
29	5013-	10539-00	R25, R27, R33	3	5283-	10552-00	U38, U39	IC, 74F04 INVERTER		3				
28	5013-	10538-00	R41, R48, R55	3	5282-	10186-00	U40	IC, 74S04 HEX INV		2				
27	5013-	10537-00	R26, R32, R38	3	5281-	09136-00	U14, U43	IC, 74LS273 OCT F/F		1				
26	5013-	10536-00	R39	1	5779-	10366-00		BARE PC BOARD		1				

B I L L O F M A T E R I A L S



REV	DESCRIPTION OF CHANGE	DATE	BY
1	INITIAL	1/19/59	JCT-53



NOTES :

1) LAST AIR USED

ECSP

ABJ

CROO

L4

Q14

SHIP6

2) VA = VALTS AND AVAILAGE

3) VR = VOLTAGE

4) VTR = VOLTAGE

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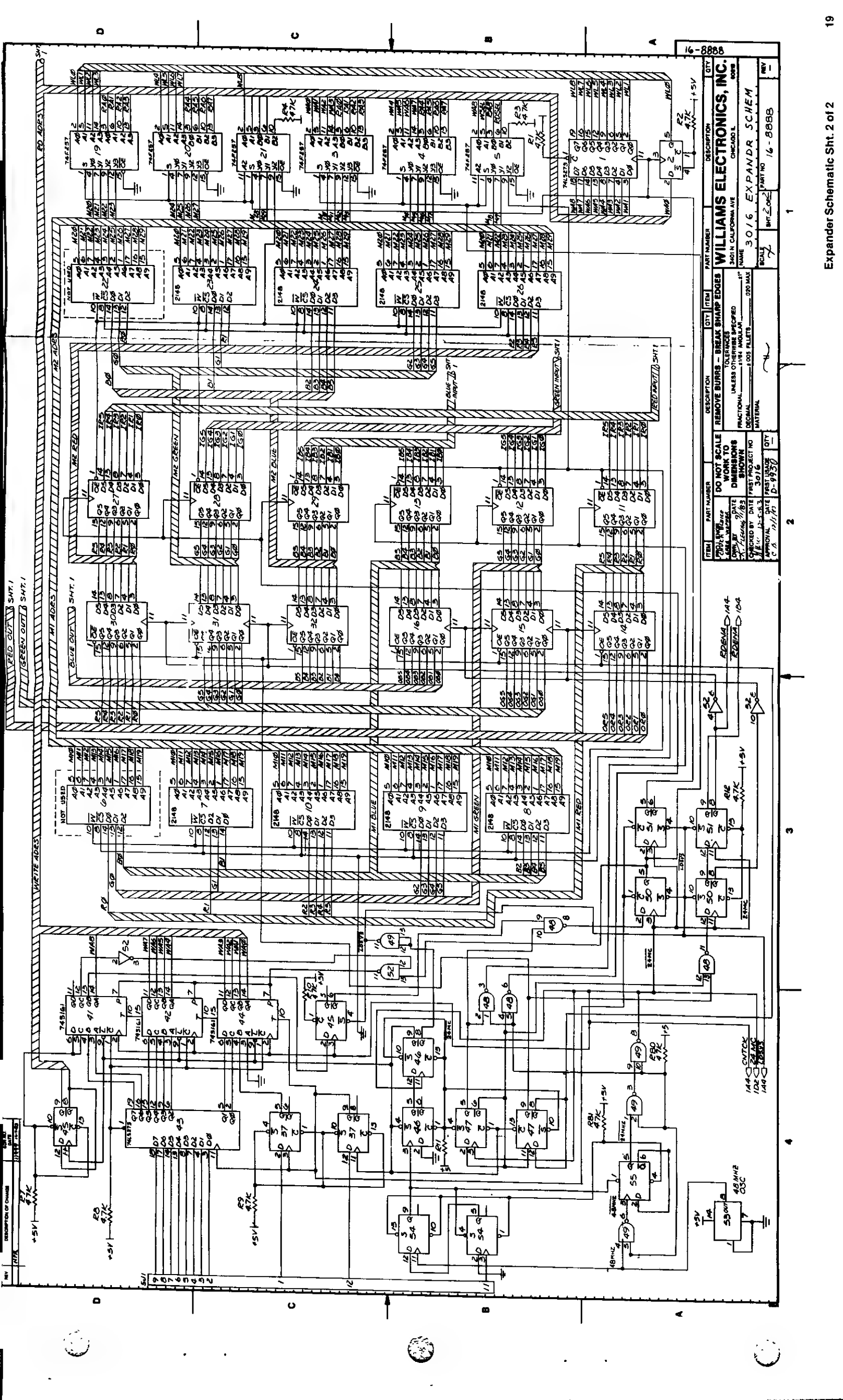
805) VTR = VOLTAGE

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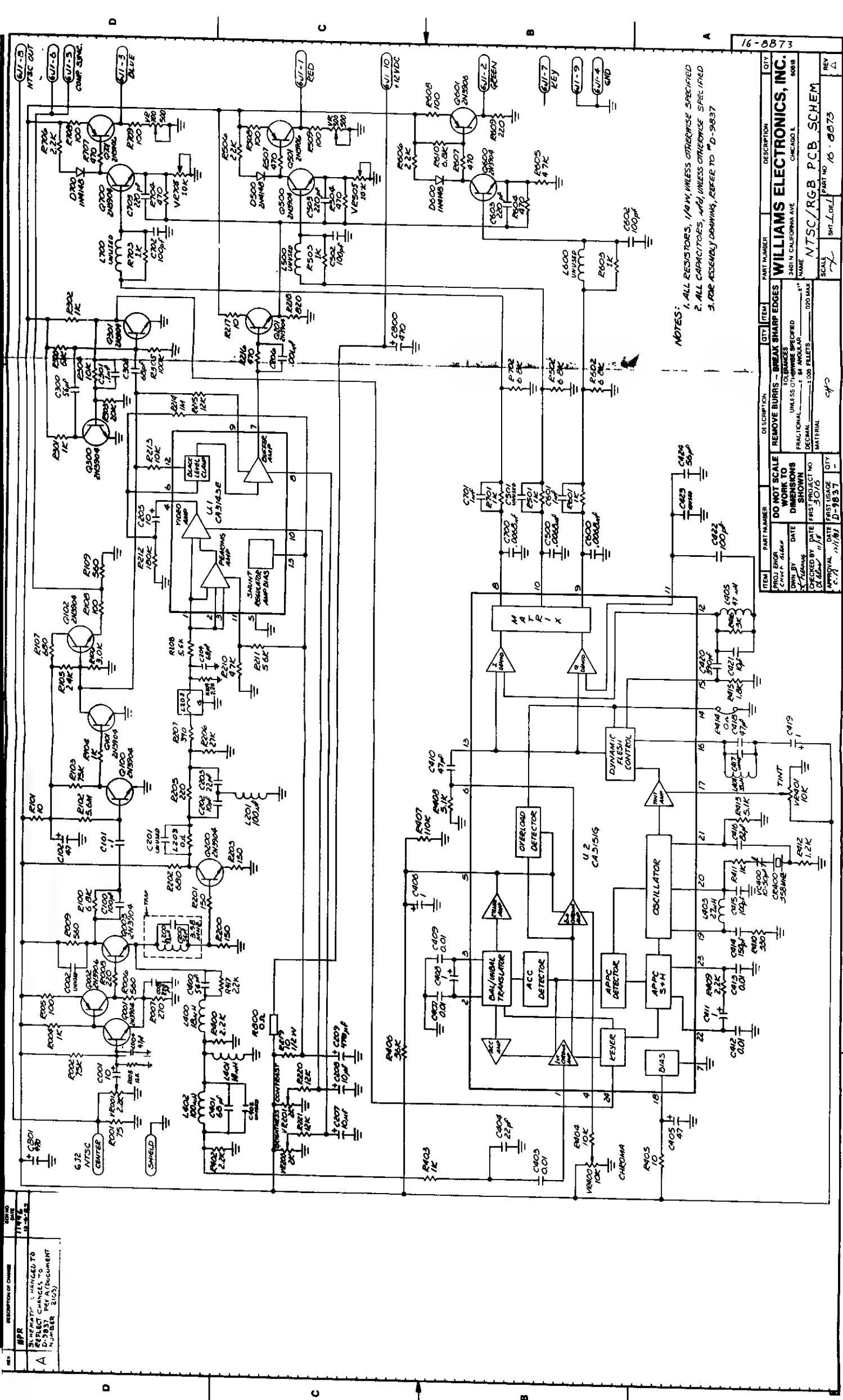
808) VTR = VOLTAGE

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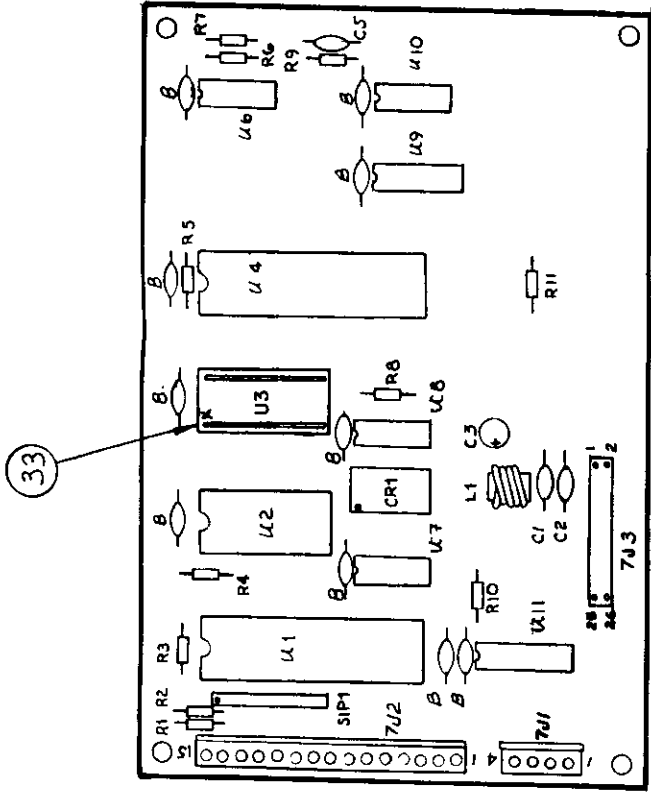
ITEM		PART NUMBER		DESCRIPTION		QTY	
DO NOT SCALE		REMOVE BURRS - BREAK SHARP EDGES		UNLESS OTHERWISE SPECIFIED		FRACTIONAL	
WORKING DATE		10/1/70		1/184 ANNUAL		3016	
CHECKED BY		DATE		PROJECT NO.		3016	
APPROVAL		DATE		FIRST ISSUE		D-9550	
C.B.		11/1/70		D-9550		3016	

WILLIAMS ELECTRONICS, INC.		3016 EXPANDR SCHEM	
3401 N. CALIFORNIA AVE		CHICAGO, ILL.	
REV		REV	
16-8888		16-8888	

[illegible]

NOTES:

1. ALL RESISTORS, 1/4W UNLESS OTHERWISE SPECIFIED
2. ALL CAPACITORS, 47P, UNLESS OTHERWISE SPECIFIED
3. FOR ASSEMBLY DRAWINGS, REFER TO "D-9837"



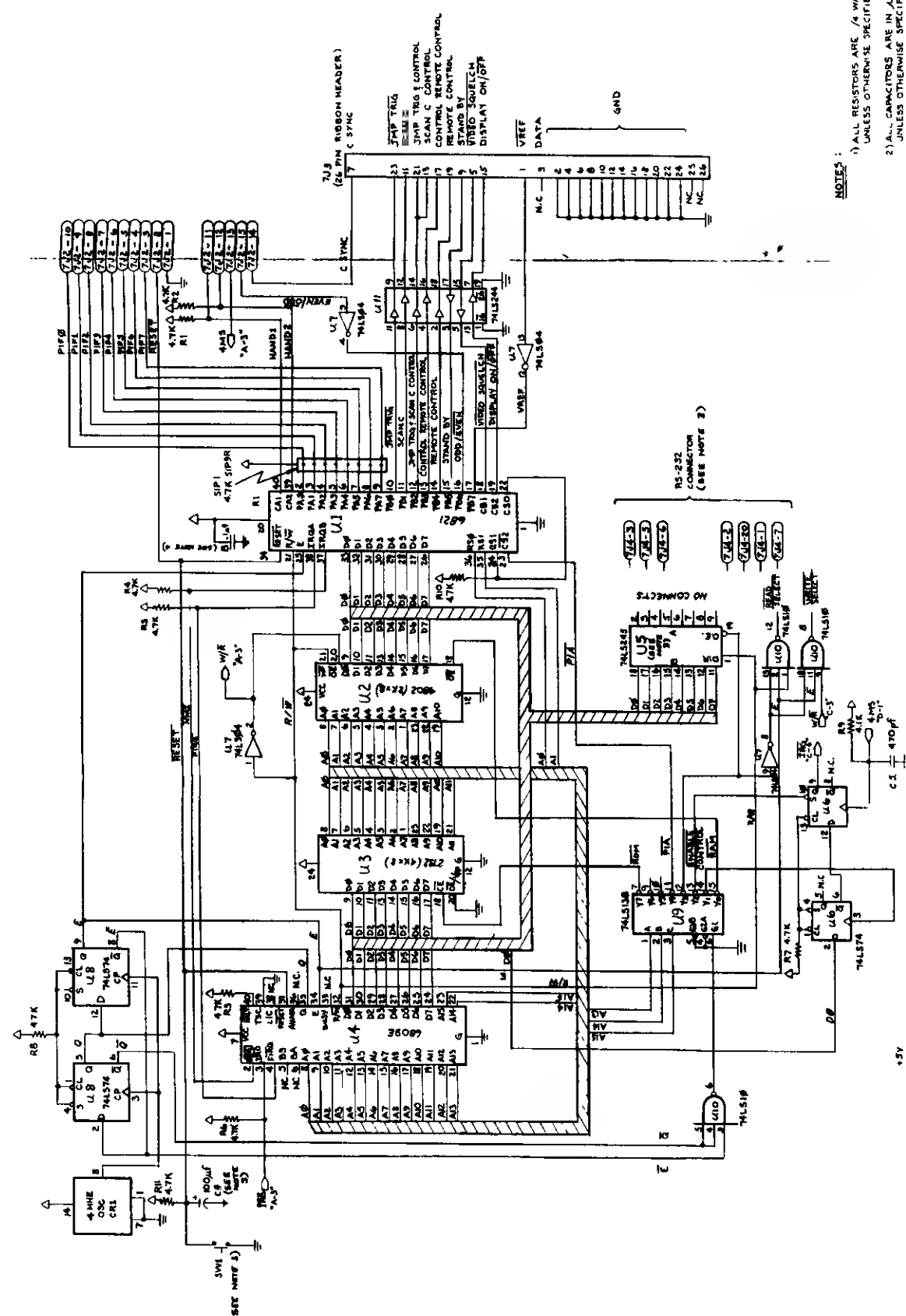
GAME NAME	STAR RIDER
ASSY NO.	C-9928
U3	A-5343-10636

NOTES:
 1) 'B' - INDICATES BYPASS CAPACITORS.
 2) FOR SCHEMATIC REFER TO DWG. 16-8887.

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
33	5700-09004-00	IC 3	SOCKET, 24 PIN	1
32	---	---	---	---
31	---	---	---	---
30	---	---	---	---
29	5531-10161-00	L 1	COIL, 2.2 UH	1

ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.
28	5521-10506-00	CR1	XTAL / OSC., 4MHZ OSC.	1
27	---	---	---	---
26	---	---	---	---
25	5791-10604-00	J3	CONNECTOR, 26PIN RIB. HEADER/SHROUD	1
24	5791-09074-00	J2	CONNECTOR, 13P MALE MOLEX	1
23	5791-09028-00	J1	CONNECTOR, 4P MALE MOLEX	1
22	---	---	---	---
21	5281-09215-00	U7	I.C. 74LS04	1
20	5281-09867-00	U11	I.C. 74LS244	1
19	5281-09235-00	U10	I.C. 74LS10	1
18	5281-09487-00	U6, U8	IC 74LS74	2
17	5340-09878-00	U2	I.C. 2KX8 RAM	1
16	---	---	---	---
15	---	---	---	---
14	5281-09745-00	U9	I.C. 74LS138	1
13	5430-08972-00	U1	I.C. 6821 PIA	1
12	5400-09490-00	U4	I.C. 6809E MPU	1
11	---	---	---	---
10	---	---	---	---
9	5043-09845-00	C1, C2	CAPACITOR, .001UF	2
8	5013-08980-00	B (SEE NOTE 1)	CAPACITORS, .01UF	10
7	5040-09421-00	C3	CAPACITOR, 100UF 25V	1
6	5043-09065-00	C5	CAPACITOR, 470PF	1
5	---	---	---	---
4	5010-08991-00	R1 THRU R11	RESISTORS, 4.7K OHM 1/4 W	11
3	5019-09342-00	SIP1	RESISTOR, 4.7K OHM SIP 9R	1
2	---	---	---	---
1	5772-10365-00	---	BARE P.C. BOARD	1

REV	DESCRIPTION OF CHANGE	DATE
1	NPR	11/17/68



- NOTES:
- 1) ALL RESISTORS ARE 1/4 WATT UNLESS OTHERWISE SPECIFIED.
 - 2) ALL CAPACITORS ARE IN μF UNLESS OTHERWISE SPECIFIED.
 - 3) NOT USED FOR PIONEER V.D. PLAYER.
 - 4) B - INDICATES BYPASS CAPACITOR, TYPICAL 0.1 μF .

ITEM	PART NUMBER	DESCRIPTION	QTY	TEMP	REVISION
1	16-8887	WILLIAMS ELECTRONICS, INC.			
2	16-8887	WILLIAMS ELECTRONICS, INC.			
3	16-8887	WILLIAMS ELECTRONICS, INC.			
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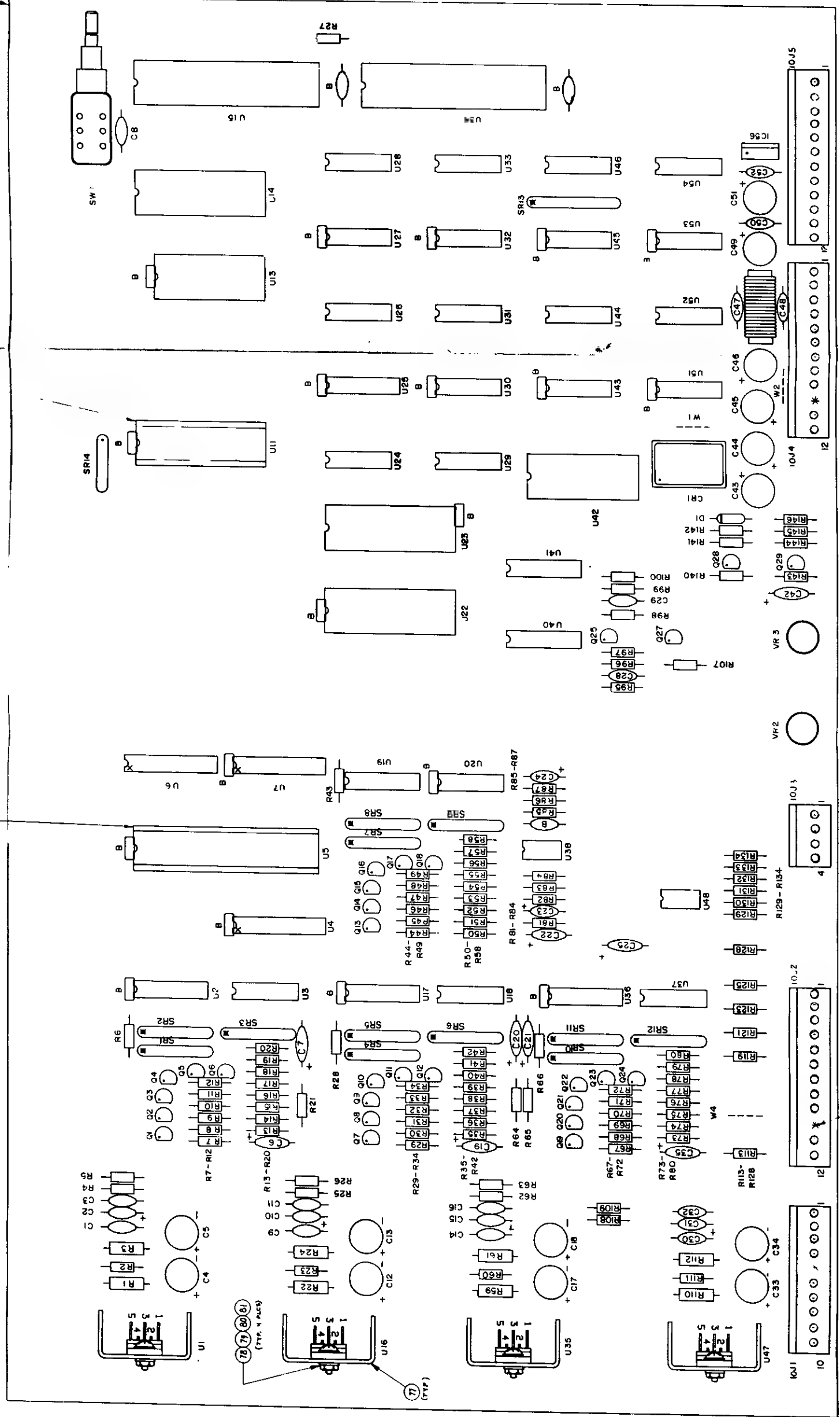
NOTES:

- 1- REFER TO SCHEMATIC REFER TO DWG# 16-8890
- 2- RESISTOR 4.7 K Ω
- 3- R6, R21, R27, R28, R43, R50, R64, R65, R66, R113, R119, R121, R123, R125, R126, R140
- 3- RESISTOR, 1K Ω
R4, R5, R25, R26, R62, R63, R108, R109
R141, R142, R145
- 4- CAPACITOR, 10MFD.:
C2, C6, C7, C10, C15, C19, C20, C21, C22, C23, C24, C25, C31, C35

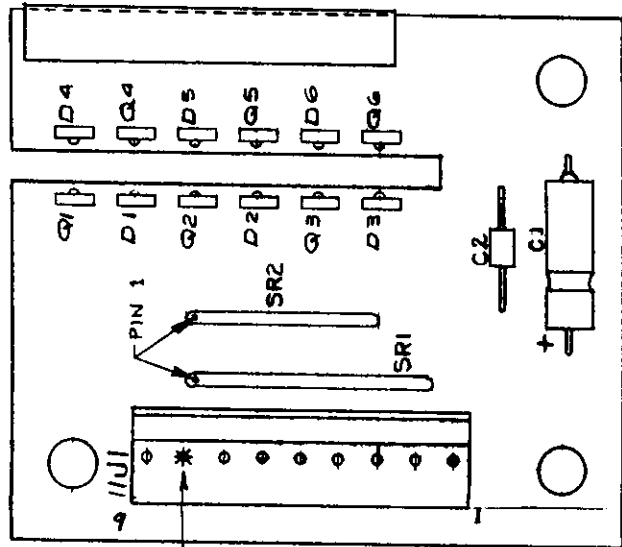
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.	
					60	5014-10261-00	VR2, VR3	TRIM POT, RC MOUNT 10K OHM	2	30	A 5415 101543	U11	SOUND ROM (ROM 271) 2764	1	
					59	5010-09181-00			4	29	5000-10176-00		SOCKET, 28-PIN IC	1	
					58	5010-09181-00	R3, R24, R61, R112	RESISTOR, 100M 1/2W 5%	8	28	08985-00		SOCKET, 40-PIN IC	1	
					57	5010-09361-00	R1, R22, R39, R110	RESISTOR, 220 OHM 1/2W 5%	4	27	5400 10320 00	U5	MPU, 68B09E	1	
82	5344-10440-00		IC, 2812 FIF0	2	56	5010-10437-00	R14, R14, R33, R36, R48, R52, R114, R115	RESISTOR, 470 OHM 1/4W 2%	8	26	3250-09515-00	U56	IC, 7906 REG. -5V 1A	1	
	5344-10429-00		IC, 2812 FIF0 2 MHz	0	55	5010-10204-00	R3, R1, R31, R38, R46, R54, R63, R76	RESISTOR, 10K OHM 1/4W 2%	8	25	5370-09156-00	U1, U16, U35, U47	IC, TDA2002 AUD AMP	4	
4				4	54	5010-10203-00	R12, R13, R34, R41, R43, R57, R72, R73	RESISTOR, 2.2K OHM 1/4W 2%	8	24	5370-09521-00	U38, U48	IC, 1458 GP. AMP, DUAL	2	
81	20-9229		THERMAL COMPOUND	4/R	53	5013-10437-00	R10, R20, R32, R42, R47, R58, R70, R80	RESISTOR, 4.7K OHM 1/4W 2%	8	23	5371-09152-00	U40, U41	IC, 1408 D/A CONV	2	
80	4703-00007-00		LOCK WASHER, #6 EXT. TOOTH	4	52	5013-10546-00	R12, R18, R33, R40, R55, R73, R77, R78	RESISTOR, 10K OHM 1/4W 2%	8	22	5340-09878-00	U13	IC, 2016 RAM/3 2Kx8	1	
79	4406-0117-00		HEX NUT G-32	4	51	5013-10548-00	R8, R15, R30, R33, R43, R53, R63, R75	RESISTOR, 20K OHM 1/4W 2%	8	21	4				#
78	4006-01003-06		SCREW G-32 x 3/8" P-PH-3	4	50	5010-09161-00	R2, R23, R60, R111	RESISTOR, 2.2 OHM 1/4W 5%	4	20	5433-10459-00	U14	IC, 68B40 PROG TIMER 2MHz	1	
77	5705-09199-00		HEAT SINK THERMALLOY #6080	4	49	5010-09534-00	W1, W2, W4	RESISTOR, 0 OHM 1/4W WIRE JUMPER	3	19	5430-10322-00	U15, U34	IC, 68B21 PZR 2MHz	2	
76	5791-09028-00	U3	4-PIN HEADER 09-G5-1041	1	48	5010-09039-00	R143	RESISTOR, 10 OHM 1/4W 5%	1	18	4				4
75	5791-09444-00	U1	10-PIN HEADER 09-G5-1101	1	47	5010-09358-00	SEE NOTE 3	RESISTOR, 1K 1/4W 5%	11	17	5281-09533-00	U46	IC, 74LS339 4-BIT COUNTER	1	
74	5791-09043-00	U2, U4, U5	12-PIN HEADER 09-G5-1121	3	46	5010-09083-00	R1, R83, R84, R94, R97, R99, R100, R107	RESISTOR, 3.3K 1/4W 5%	8	16	5281-09308-00	U6	IC, 74LS245 OCT TRNCE	1	
73	5641-09312-00	SW1	SW P DPDT 100V 5A	1	45	5010-08991-00	SEE NOTE 2	RESISTOR, 4.7K 1/4W 5%	16	15	5281-09867-00	U4, U7	IC, 74LS244 OCTAL BUFFER	2	
	5641-09371-00		SW P SPDT 115V 25A	0	44	5010-09034-00	R144, R146	RESISTOR, 10K 1/4W 5%	2	14	5281-09753-00	U2, U17, U19, U36	IC, 74LS174 HEX F/F	4	
72				4	43	5010-09328-00	R1, R13, R29, R35, R44, R51, R67, R73	RESISTOR, 59K 1/4W 5%	8	13	5281-09010-00	U42	IC, 74154 4-1/6 DECODER	1	
71	5043-09844-00	C28, C29	CAPACITOR, 47 PF 50V ±20%	2	42	5010-09162-00	R130, R131, R133, R134	RESISTOR, 100K 1/4W 5%	4	12	5281-09246-00	U25	IC, 74LS139 2-4 DECODER	1	
70	5043-09845-00	C3, C11, C16, C32	CAPACITOR, 100 MFD 50V ±20%	4	41	5010-09442-00	R129, R132	RESISTOR, 330K 1/4W 5%	2	11	5281-09797-00	U29	IC, 74LS86 QUAD XOR	1	
69	5043-09850-00	C8, C17, C48 BYPASS (8)	CAPACITOR, .01 MFD 50V ±80-20	25	40	5010-09179-00	R95, R98	RESISTOR, 3.3M 1/4W 5%	2	10	5281-09487-00	U43, U51-U54	IC, 74LS374 DUAL D F/F	5	
68	5043-09896-00	C13, C14, C30, C50, C52	CAPACITOR, .1 MFD 50V ±20%	6	39	4			4	9	5281-09500-00	U26, U27, U31, U35	IC, 74LS32 QUAD OR	4	
67	5041-09163-00	C42	CAPACITOR, 2.2 MFD	1	38	5019-09780-00	SR1-SR12	SIR, 1K 4R 8 5%	12	8	5281-09850-00	U28	IC, 74LS11 TRIPLE AND	1	
66	5040-09343-00	SEE NOTE 4	CAPACITOR, ELECT, AXIAL 10 MFD 25V ±20%LL	0	37	5019-09786-00	SR14	SIR, 4.7K 5R 6 5%	1	7	5281-09235-00	U45	IC, 74LS10 TRIPLE NAND	1	
	5041-09243-00		CAPACITOR, TANT, AXIAL 10 MFD 10V	14	36	5019-09362-00	SR13	SIR, 4.7K 9R 10 5%	1	6	5281-09743-00	U44	IC, 74LS08 QUAD AND	1	
65	5040-09422-00	C51	CAPACITOR, ELECT, RAD 47 MFD 50V ±50-10%	1	35	4			4	5	5280-09309-00	U37	IC, 7407 HEX BUF OC	4	
64	5040-09421-00	C4, C12, C13, C43, C44, C45, C46, C49	CAPACITOR, ELECT, RAD 100 MFD 25V, ±50-10%	9	34	5520-10438-00	CR1	OSCILLATOR, 8 MHz	1	4	5281-09215-00	U24	IC, 74LS04 HEX INVERTER	1	
63	5040-09776-00	C5, C13, C16, C34	CAPACITOR, ELECT, RAD 470 MFD 16V ±50-10%	4	33	5075-09018-00	DI	ZENER DIODE, 1N5996A 6.8V	1	3	5281-09247-00	U32	IC, 74LS02 QUAD NOR	1	
62	4			4	32	5160-10263-00	Q25, Q27, Q28, Q29	TRANSISTOR, NPN 2N3904	4	2	5281-09499-00	U30	IC, 74LS00 QUAD NAND	1	
61	5531-09822-00	L1	INDUCTOR, 4.7 MH, 3A	1	31	5190-10870-00	Q1-Q24	TRANSISTOR, PNP 2N3906	24	1	5778-10369-00		BARE PC BOARD, -SOUND	1	

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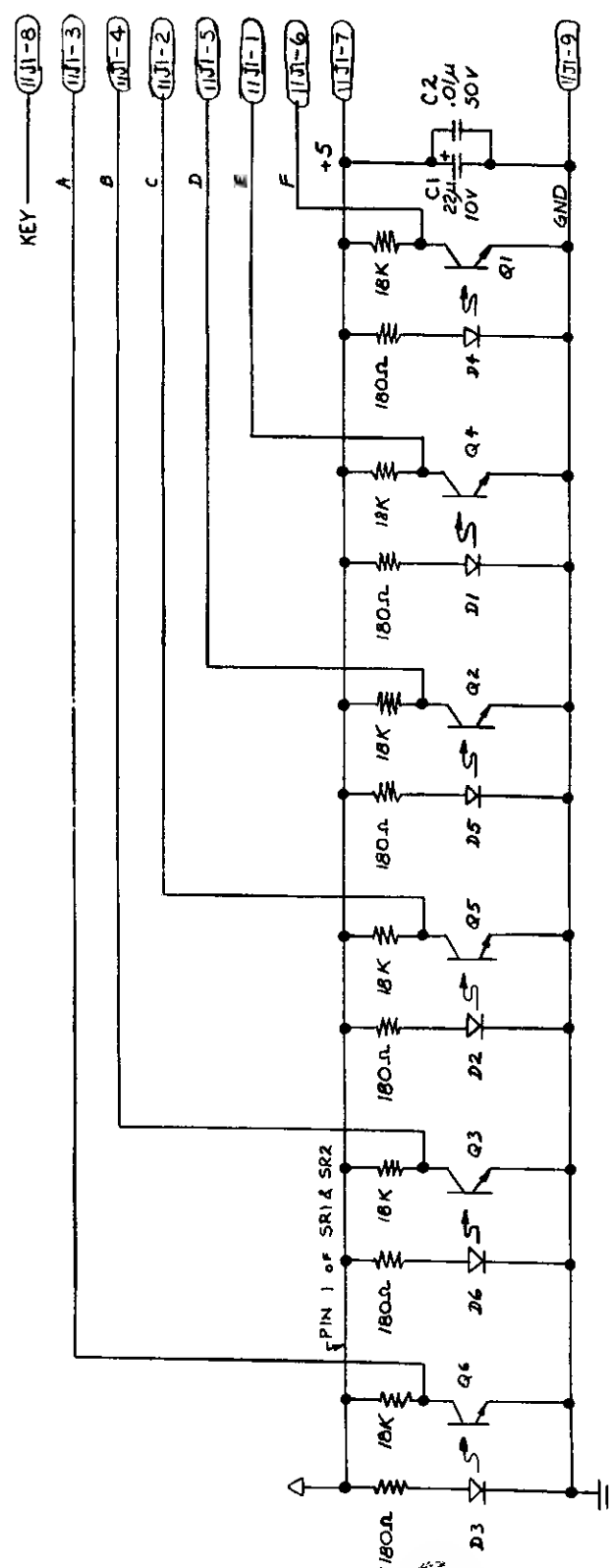
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KEYING PIN



NOTE: RESISTORS ARE IN SIPS.
 SR2 180Ω
 SR1 18K

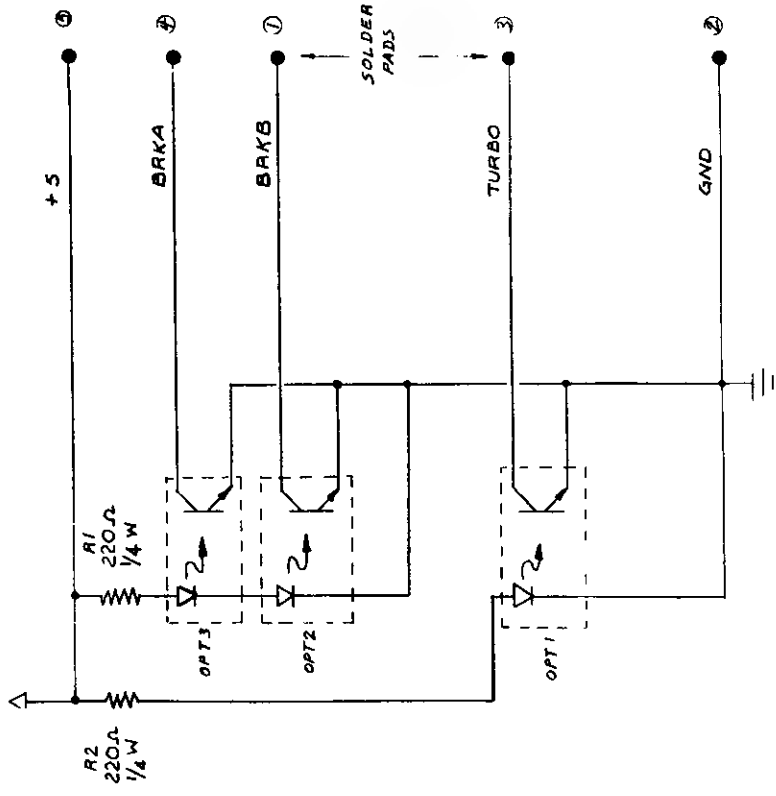
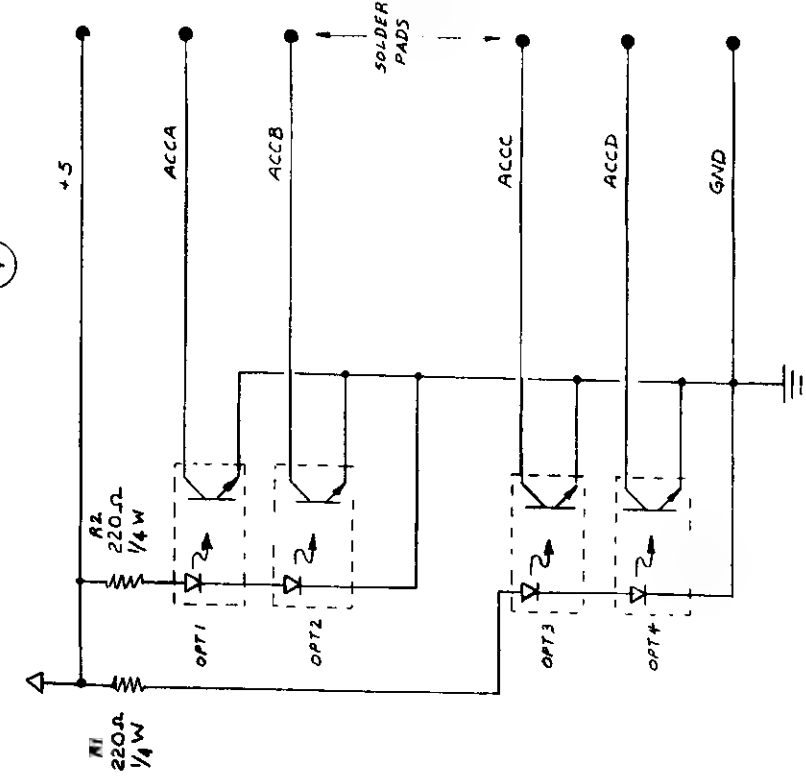
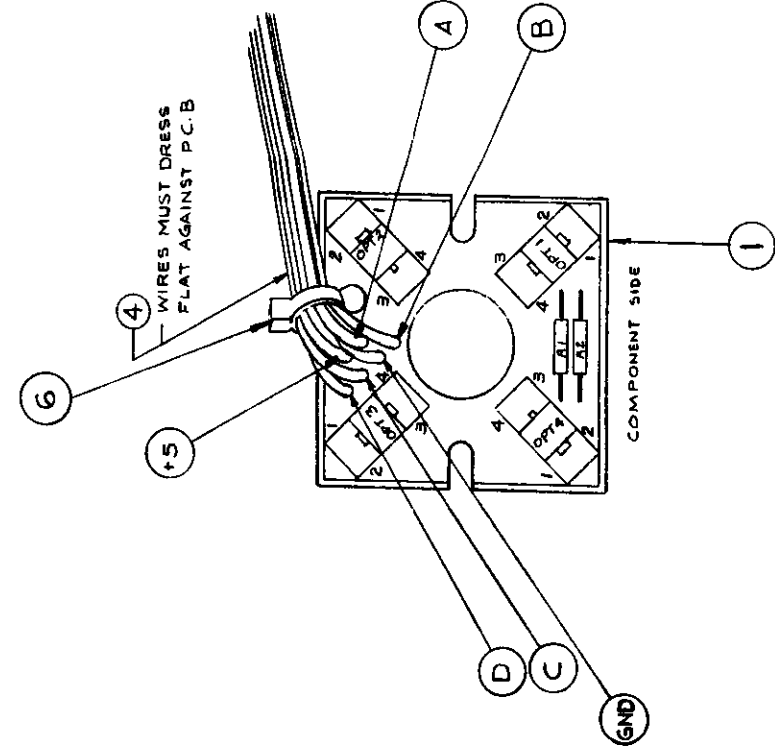
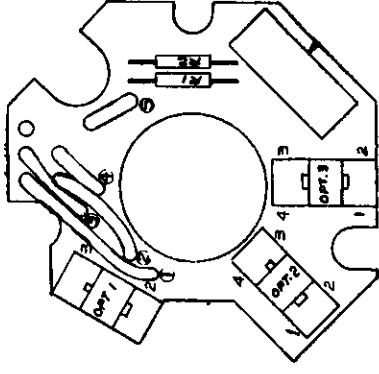
ITEM	PART NUMBER	PART DESIGNATION	DESCRIPTION	QTY.
9	16-8850-16		LABEL - PCB ID	1
8	5791-09027-00	J1	CONNECTOR, 9P MALE	1
7	5043-08996-00	C2	CAPACITOR, 0.1μf 50V, +/-20	1
6	5040-09545-00	C1	CAPACITOR, 22μf 10V, +/-20	1
5	5019-10158-00	SR2	SIP, 180 OHMS 7R8P 5%	1
4	5019-10387-00	SR1	SIP, 18K OHMS 9R10P 5%	1
3	5163-10509-00	Q1, Q2, Q3, Q4, Q5, Q6	PHOTOTRANSISTOR NPN 3.4 mA	6
2	5671-10508-00	D1, D2, D3, D4, D5, D6	I.R. LED 40 mA .1W	6
1	5779-10435-00		BARE P.C.B.	1

SOLDER PAD	WIRE COLOR	FUNCTION
+5V	GRAY	+5VDC
GND	BLACK	GROUND
A (OPT 1)	ORANGE/VIOLET (L.S.B.)	THROTTLE A
B (OPT 2)	ORANGE/BLUE	THROTTLE B
C (OPT 3)	ORANGE/GREEN	THROTTLE C
D (OPT 4)	ORANGE/YELLOW	THROTTLE D (M.S.B.)

5	H-10282		H/BAR BRAKE CABLE	1
4	16-8850-97		LABEL-PCB ID	1
3	5010-09160-00	R1, R2	RESISTOR, 220 OHM 5% 1/4 W	2
2	5490-10159-00	OPT01, OPT02 OPT03	OPTO INTERRUPTER	3
1	5779-10436-00		BARE PC BOARD	1
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.

G	03-7520-2		NYLON TY-WRAP	1
5	16-8850-95		LABEL-PCB ID	1
4	H-10283		H/BAR THROT CABLE	1
3	5010-09160-00	R1, R2	RESISTOR, 220 OHM 5% 1/4 W	2
2	5490-10159-00	OPT1, OPT2, OPT3, OPT4	OPTO INTERRUPTER	4
1	5779-10434-00		BARE PC. BOARD	1
ITEM	PART NO.	PART DESIGNATION	DESCRIPTION	QTY.

PAD	SIGNAL	WIRE COLOR
1	BRKB	ORG-RED
2	GND	BLK
3	TURBO	ORG-BLK
4	BRKA	ORG
5	+5	GREY

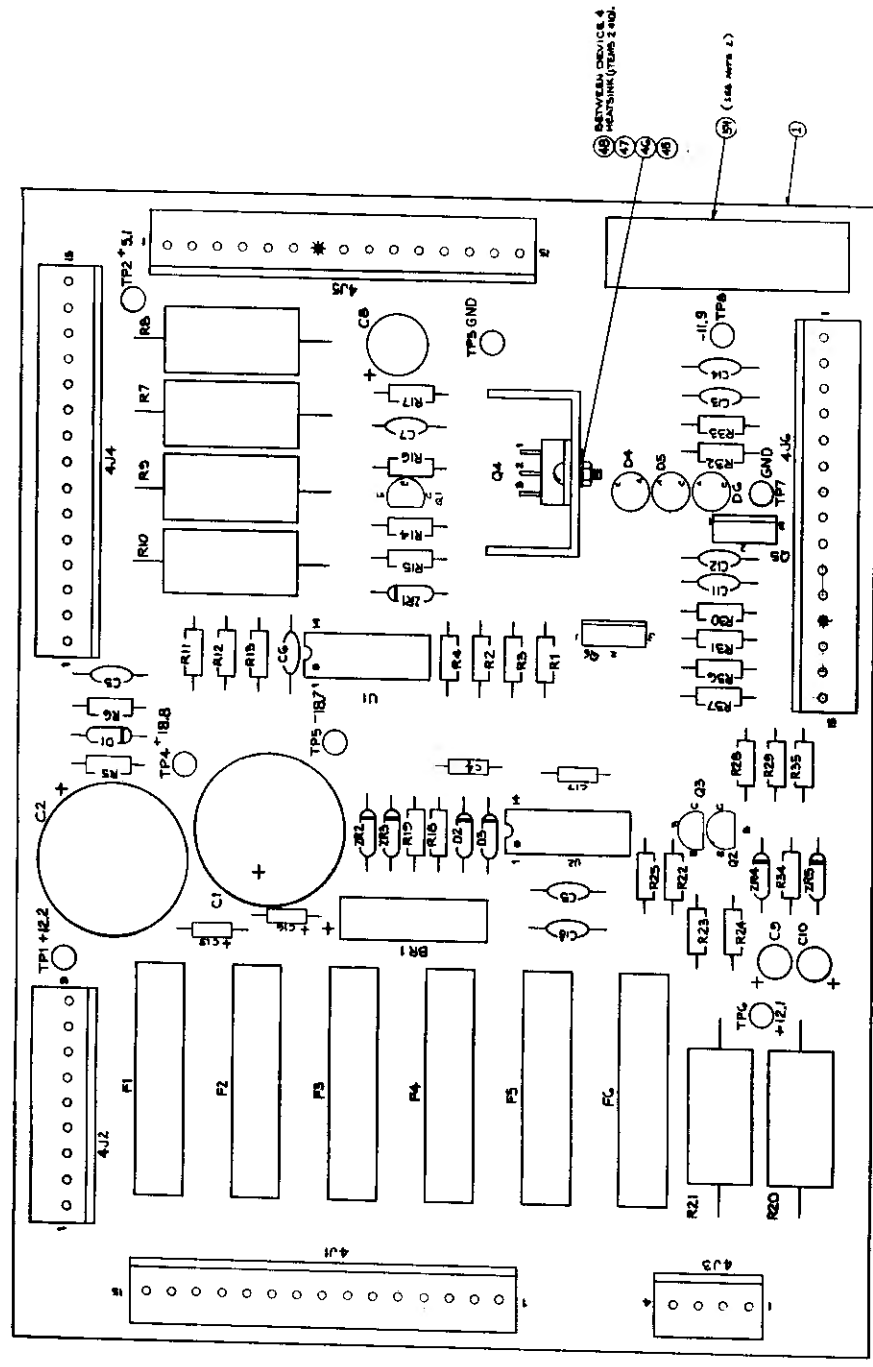


NOTE:
SEE ASSY DRAWING
C-9994 FOR LOCATIONS.

15	5010-10485-00	CAP 5.000UF 25V 100-10	1
16	HM-30018-23	WIRE 18AWG RED/GRN	6
17	HM-30018-23	WIRE 18AWG 10 PIN	2
18	HM-30018-23	WIRE 18AWG 10 PIN	2
19	HM-30018-23	WIRE 18AWG 10 PIN	2
20	HM-30018-23	WIRE 18AWG 10 PIN	2
21	HM-30018-23	WIRE 18AWG 10 PIN	2
22	HM-30018-23	WIRE 18AWG 10 PIN	2
23	HM-30018-23	WIRE 18AWG 10 PIN	2
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35	HM-30018-23	WIRE 18AWG 10 PIN	2
36	HM-30018-23	WIRE 18AWG 10 PIN	2
37	HM-30018-23	WIRE 18AWG 10 PIN	2
38	HM-30018-23	WIRE 18AWG 10 PIN	2
39	HM-30018-23	WIRE 18AWG 10 PIN	2
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42	HM-30018-23	WIRE 18AWG 10 PIN	2
43	HM-30018-23	WIRE 18AWG 10 PIN	2
44	HM-30018-23	WIRE 18AWG 10 PIN	2
45	HM-30018-23	WIRE 18AWG 10 PIN	2
46	HM-30018-23	WIRE 18AWG 10 PIN	2
47	HM-30018-23	WIRE 18AWG 10 PIN	2
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49	HM-30018-23	WIRE 18AWG 10 PIN	2
50	HM-30018-23	WIRE 18AWG 10 PIN	2
51	HM-30018-23	WIRE 18AWG 10 PIN	2
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53	HM-30018-23	WIRE 18AWG 10 PIN	2
54	HM-30018-23	WIRE 18AWG 10 PIN	2
55	HM-30018-23	WIRE 18AWG 10 PIN	2

HEAT SINK D-10063 BILL OF MATERIAL

ITEM NUMBER	PART NUMBER	PART DESCRIPTION	QUANTITY
55	5010-10485-00	TP1-TP8	1
56	10-0000-00	TP1-TP8	1
57	10-0000-00	TP1-TP8	1
58	10-0000-00	TP1-TP8	1
59	10-0000-00	TP1-TP8	1
60	10-0000-00	TP1-TP8	1
61	10-0000-00	TP1-TP8	1
62	10-0000-00	TP1-TP8	1
63	10-0000-00	TP1-TP8	1
64	10-0000-00	TP1-TP8	1
65	10-0000-00	TP1-TP8	1
66	10-0000-00	TP1-TP8	1
67	10-0000-00	TP1-TP8	1
68	10-0000-00	TP1-TP8	1
69	10-0000-00	TP1-TP8	1
70	10-0000-00	TP1-TP8	1
71	10-0000-00	TP1-TP8	1
72	10-0000-00	TP1-TP8	1
73	10-0000-00	TP1-TP8	1
74	10-0000-00	TP1-TP8	1
75	10-0000-00	TP1-TP8	1
76	10-0000-00	TP1-TP8	1
77	10-0000-00	TP1-TP8	1
78	10-0000-00	TP1-TP8	1
79	10-0000-00	TP1-TP8	1
80	10-0000-00	TP1-TP8	1
81	10-0000-00	TP1-TP8	1
82	10-0000-00	TP1-TP8	1
83	10-0000-00	TP1-TP8	1
84	10-0000-00	TP1-TP8	1
85	10-0000-00	TP1-TP8	1
86	10-0000-00	TP1-TP8	1
87	10-0000-00	TP1-TP8	1
88	10-0000-00	TP1-TP8	1
89	10-0000-00	TP1-TP8	1
90	10-0000-00	TP1-TP8	1
91	10-0000-00	TP1-TP8	1
92	10-0000-00	TP1-TP8	1
93	10-0000-00	TP1-TP8	1
94	10-0000-00	TP1-TP8	1
95	10-0000-00	TP1-TP8	1
96	10-0000-00	TP1-TP8	1
97	10-0000-00	TP1-TP8	1
98	10-0000-00	TP1-TP8	1
99	10-0000-00	TP1-TP8	1
100	10-0000-00	TP1-TP8	1

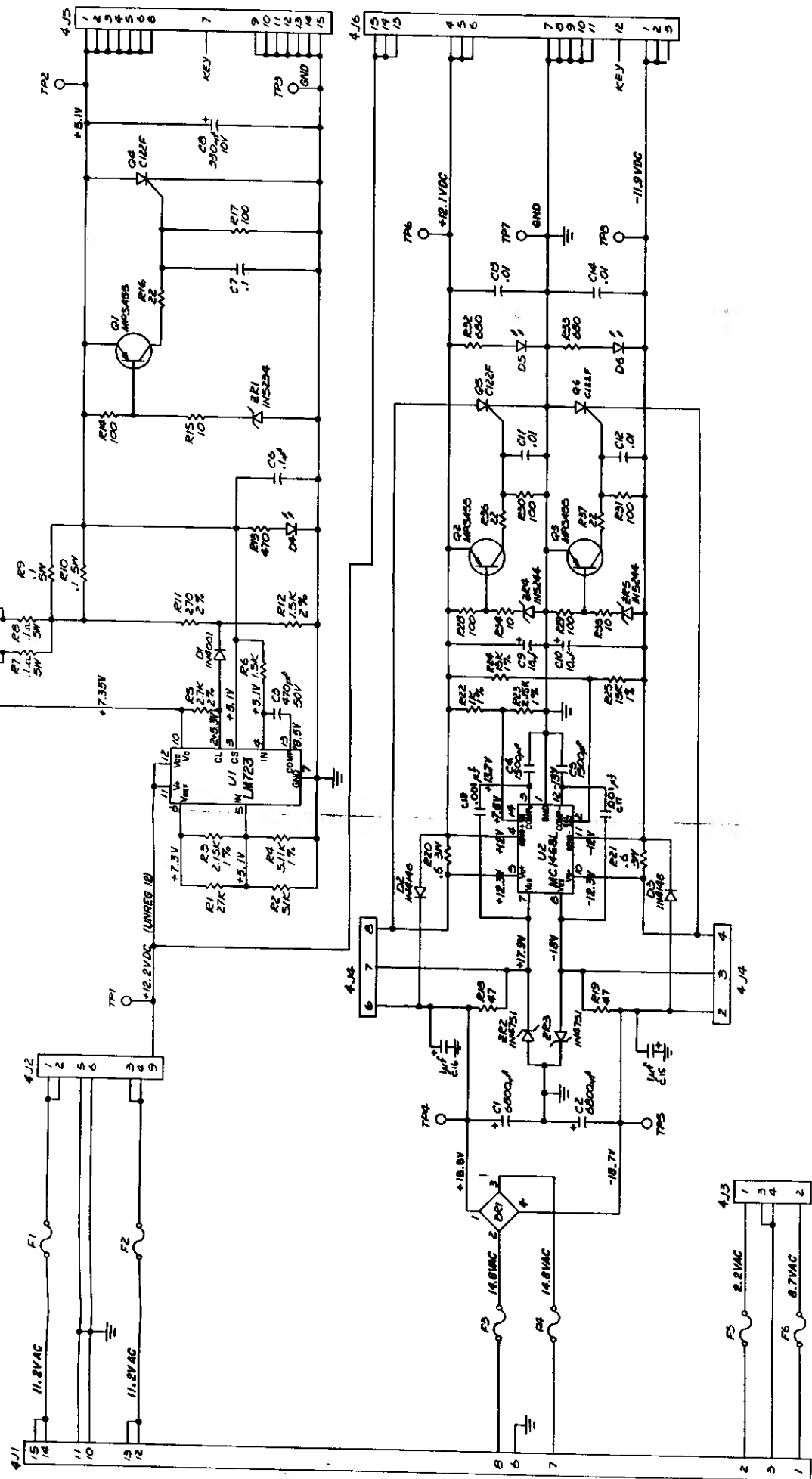


NOTES:
1. FOR SCHEMATIC, REFER TO DWG # 16-8701
2. ITEM 54 LOCATED IN APPENDIX.

ITEM NUMBER	PART NUMBER	PART DESCRIPTION	QUANTITY
34	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
35	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
36	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
37	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
38	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
39	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
40	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
41	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
42	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
43	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
44	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
45	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
46	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
47	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
48	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
49	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
50	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
51	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
52	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
53	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
54	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
55	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
56	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
57	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
58	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
59	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
60	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
61	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
62	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
63	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
64	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
65	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
66	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
67	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
68	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
69	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
70	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
71	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
72	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
73	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
74	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
75	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
76	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
77	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
78	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
79	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
80	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
81	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
82	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
83	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
84	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
85	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
86	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
87	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
88	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
89	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
90	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
91	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
92	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
93	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
94	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
95	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
96	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
97	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
98	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
99	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1
100	5010-10485-00	RESISTOR, 1K, 1%, 1/4W	1

BILL OF MATERIALS

REV	DESCRIPTION OF CHANGE	DATE
1	NPR	11-15-50



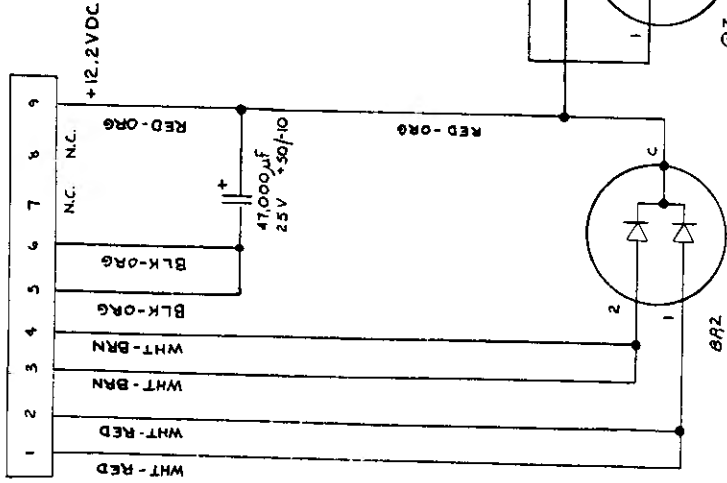
NOTE: AC VOLTAGE REFERENCED TO IT'S RETURN LINE.

ITEM	PART NUMBER	DESCRIPTION	QTY
1	DO NOT SCALE	REMOVE BURRS - BREAK SHARP EDGES	
2	WORK TO DIMENSIONS SHOWN	TOLERANCES UNLESS OTHERWISE SPECIFIED	
3	DATE 11/15/50	FRACTIONAL 1/16" ANGULAR .070 MAX	
4	DATE 11/15/50	DECIMAL .005 FLETS	
5	DATE 11/15/50	MATERIAL	
6	DATE 11/15/50	QTY	
7	DATE 11/15/50	QTY	
8	DATE 11/15/50	QTY	
9	DATE 11/15/50	QTY	
10	DATE 11/15/50	QTY	
11	DATE 11/15/50	QTY	
12	DATE 11/15/50	QTY	
13	DATE 11/15/50	QTY	
14	DATE 11/15/50	QTY	
15	DATE 11/15/50	QTY	
16	DATE 11/15/50	QTY	
17	DATE 11/15/50	QTY	
18	DATE 11/15/50	QTY	
19	DATE 11/15/50	QTY	
20	DATE 11/15/50	QTY	
21	DATE 11/15/50	QTY	
22	DATE 11/15/50	QTY	
23	DATE 11/15/50	QTY	
24	DATE 11/15/50	QTY	
25	DATE 11/15/50	QTY	
26	DATE 11/15/50	QTY	
27	DATE 11/15/50	QTY	
28	DATE 11/15/50	QTY	
29	DATE 11/15/50	QTY	
30	DATE 11/15/50	QTY	
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32	DATE 11/15/50	QTY	
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34	DATE 11/15/50	QTY	
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36	DATE 11/15/50	QTY	
37	DATE 11/15/50	QTY	
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96	DATE 11/15/50	QTY	
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98	DATE 11/15/50	QTY	
99	DATE 11/15/50	QTY	
100	DATE 11/15/50	QTY	

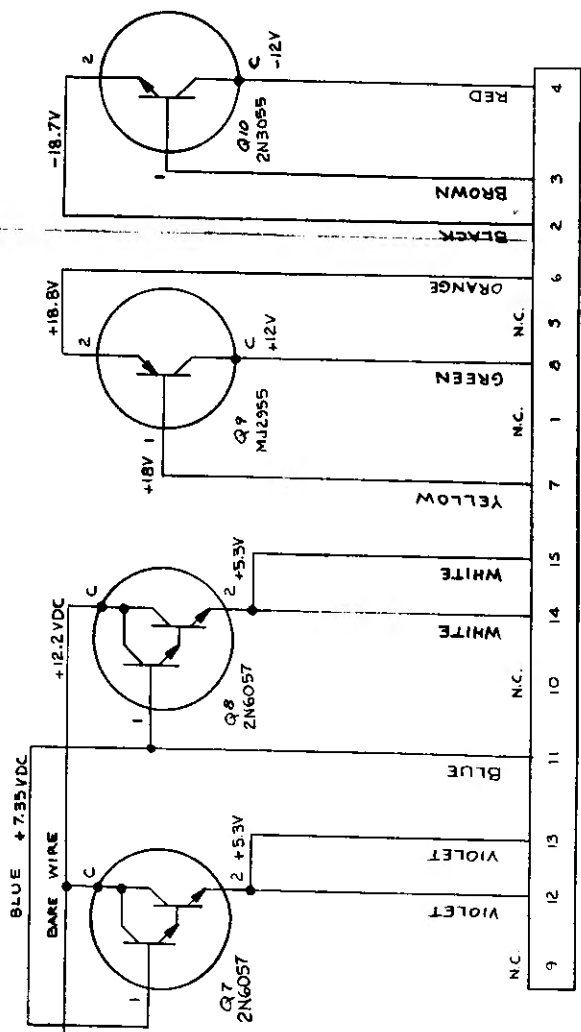
REV	DESCRIPTION OF CHANGE	BY	DATE
1	NPR		12-2-62

16-8901

4P2

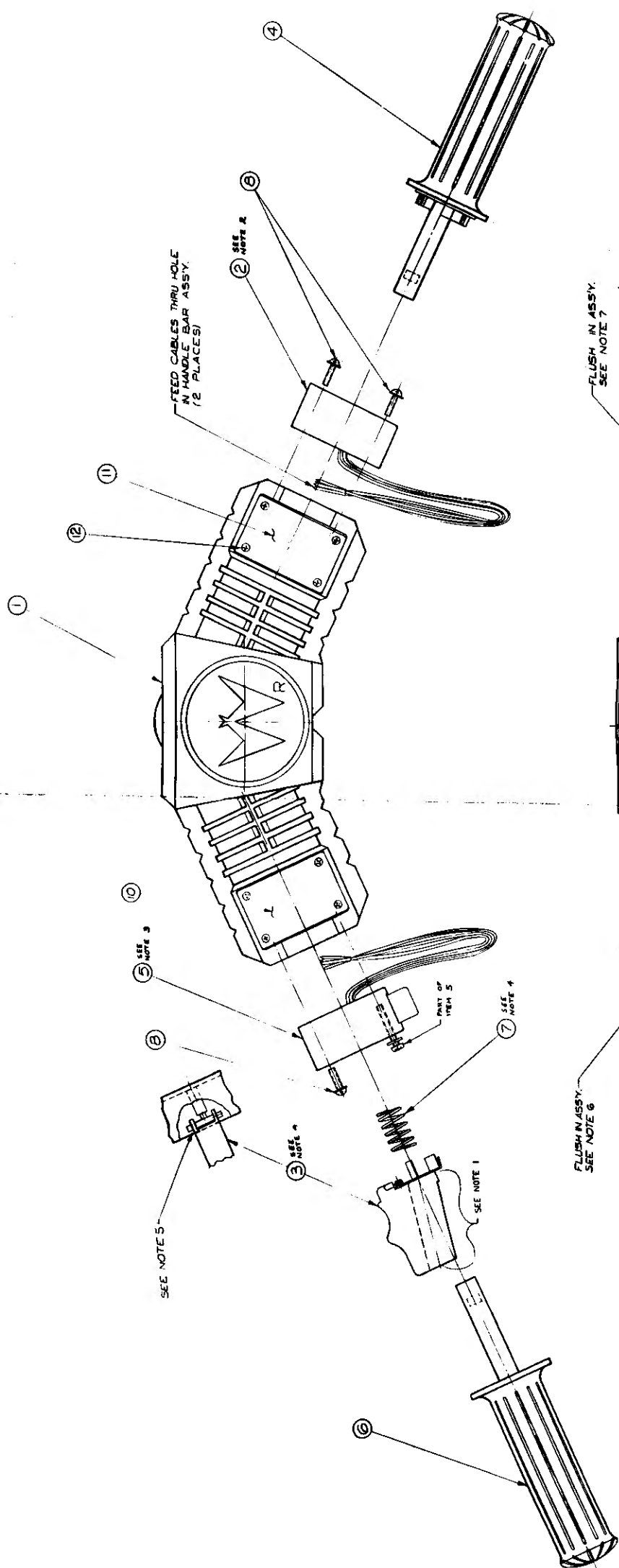


- NOTES:
1. CAPACITOR MOUNTED TO PEM PLATE, OTHER COMPONENTS MOUNTED TO HEAT SINK.
 2. SCHEMATIC REPRESENTS HEAT SINK SUB. ASSY. 5V 10A C-10069.



4P4

ITEM	PART NUMBER	DESCRIPTION	QTY
1	4P2	4P2	1
2	4P4	4P4	1
3	4P6	4P6	1
4	4P8	4P8	1
5	4P10	4P10	1
6	4P12	4P12	1
7	4P14	4P14	1
8	4P16	4P16	1
9	4P18	4P18	1
10	4P20	4P20	1
11	4P22	4P22	1
12	4P24	4P24	1
13	4P26	4P26	1
14	4P28	4P28	1
15	4P30	4P30	1
16	4P32	4P32	1
17	4P34	4P34	1
18	4P36	4P36	1
19	4P38	4P38	1
20	4P40	4P40	1
21	4P42	4P42	1
22	4P44	4P44	1
23	4P46	4P46	1
24	4P48	4P48	1
25	4P50	4P50	1
26	4P52	4P52	1
27	4P54	4P54	1
28	4P56	4P56	1
29	4P58	4P58	1
30	4P60	4P60	1
31	4P62	4P62	1
32	4P64	4P64	1
33	4P66	4P66	1
34	4P68	4P68	1
35	4P70	4P70	1
36	4P72	4P72	1
37	4P74	4P74	1
38	4P76	4P76	1
39	4P78	4P78	1
40	4P80	4P80	1
41	4P82	4P82	1
42	4P84	4P84	1
43	4P86	4P86	1
44	4P88	4P88	1
45	4P90	4P90	1
46	4P92	4P92	1
47	4P94	4P94	1
48	4P96	4P96	1
49	4P98	4P98	1
50	4P100	4P100	1



FEED CABLES THRU HOLE
IN HANDLE BAR ASSY.
(2 PLACES)

SEE
NOTE 2

FLUSH IN ASSY.
SEE NOTE 7

FLUSH IN ASSY.
SEE NOTE 6

SEE CHART

SEE NOTE 8 ⑩

SEE NOTE 8 ②

NOTES AND ASSEMBLY PROCEDURE:

1. PRIOR TO ASSEMBLY, APPLY A LIGHT COATING OF LUBRICATE TO EXTERIOR AND INTERIOR SURFACES OF HANDLE BAR AT JOINTS AND THUMB.
2. ASSEMBLE THUMBLE COVER ASSEMBLY TO HANDLE BAR ASSEMBLY AFTER LOCATING CABLE THRU HANDLE BAR ASSEMBLY.
3. ASSEMBLE BRACKET COVER ASSEMBLY TO HANDLE BAR ASSEMBLY AFTER LOCATING CABLE THRU HANDLE BAR ASSEMBLY.
4. ASSEMBLE HANDLE BAR ASSEMBLY & SPRING TO SHAFT OF HANDLE CRIP ASSEMBLY.
5. ALIGN HANDLE CRIP WITH POST IN COVER AS SHOWN.
6. FROM HANDLE CRIP ASSEMBLY INTO COVER HILL PLATE OF HANDLE CRIP IS FLUSH WITH COVER. (DO NOT PLUG SHAFT WITH BUSHING (N) AND HANDLE ASSEMBLY.)
7. ASSEMBLE THUMBLE CRIP ASSEMBLY INTO THUMBLE COVER UNTIL FLUSH WITH COVER. ALIGN FLAT SHAFT WITH SHAFT ON AND TORQUE SECURELY.
8. ASSEMBLE ITEM 9 TO ITEM 1 USING LOCUTITE 242.

ITEM # 13 WIRE HARNESS

WIRE COLOR	FUNCTION
1 ORG - BLK	THUMB SWITCH
2 ORG - RED	THUMB B M S B
3 ORG - YEL	THUMB A L S B
4 ORG - GRN	ACC C
5 ORG - BLU	ACC A
6 ORG - VIO	ACC B
7 GRV	+5 VDC
8 GRV	+5 VDC
9 BLK	GND
10 BLK	GND
11 BLK	GND
12	NOT USED

ITEM	PART NUMBER	DESCRIPTION	QTY
13	5791-0932-00	12 P 0225 03-06-2122	1
12	4024-0001-04	5/16 x 4 x 1/4 P-PH-A	8
11	31-1724-5016-5	5016-5 H/B INSR-L	1
10	31-1724-5016-5	5016-5 H/B INSR-L	1
9	31-1724-5016-5	5016-5 H/B INSR-L	1
8	4024-0001-04	12 P 0225 03-06-2122	1
7	4024-0001-04	12 P 0225 03-06-2122	1
6	4024-0001-04	12 P 0225 03-06-2122	1
5	4024-0001-04	12 P 0225 03-06-2122	1
4	4024-0001-04	12 P 0225 03-06-2122	1
3	4024-0001-04	12 P 0225 03-06-2122	1
2	4024-0001-04	12 P 0225 03-06-2122	1
1	4024-0001-04	12 P 0225 03-06-2122	1